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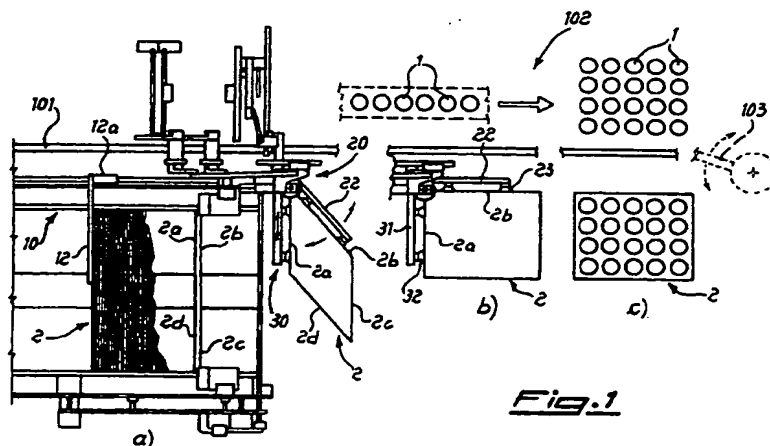
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**(54) Machine for packaging containers with a box forming part**

(57) Machine for packaging containers such as bottles and the like, comprising a part (102) for forming arrays of containers and a part for guiding/supplying (10) and forming (20, 30) boxes (2) from flattened punched blanks, in which said part for supplying and

forming the boxes (2) is arranged parallel to the longitudinal direction of feeding of the containers (1) and the said boxes.



**Fig. 1**

**EP 1 020 361 A2**

## Description

[0001] The present invention relates to a machine for packaging containers such as bottles and the like, comprising a part for forming arrays of containers and a part for guiding/supplying and forming boxes from flattened punched blanks, in which said part for supplying and forming the boxes is arranged parallel to the longitudinal direction of feeding of the containers and the said boxes.

[0002] It is known that, in the art of packaging containers with varying shapes, such as bottles, phials and the like, there exists the need to arrange said containers aligned in arrays formed by a predefined number of rows and columns depending on the dimensions of the packaging box inside which they are to be inserted by means of a handling head which removes the array of containers and places it inside the box.

[0003] It is also known that automatic machines designed for this purpose exist, said machines being substantially divided into two parts which are arranged alongside each other and synchronised: in the first of said parts the arrays of containers are formed, while in the second part the box to be filled is formed; the connection between the two parts of the machine being performed by means of the said head for gripping and inserting the array, already formed, inside the box.

[0004] In machines of the known type, forming of the box to be filled is performed by means of apparatus which are arranged in a direction transverse to the longitudinal direction of feeding of the boxes both closed and open after forming.

[0005] This arrangement of the box forming apparatus gives rise, however, to drawbacks, including an increase in the overall dimensions of the machine owing to the projection, in the transverse direction, of the forming apparatus and the difficulty of access to the forming zone in the event of malfunctioning of the said apparatus and for removal of the paper dust which accumulates in this zone.

[0006] The technical problem which is posed, therefore, is that of providing a machine for packaging containers such as bottles, phials and the like, which is provided with an apparatus for forming the box from flattened punched cardboard boxes, which allows a reduction in the overall dimensions of the machine, allows easy access to the forming zone and allows the collection of the paper dust which accumulates during forming, outside of the said machine, thus preventing the actuating and detection and control devices from being subject to malfunctions due to the presence of said dust.

[0007] These technical problems are solved according to the present invention by a machine for packaging containers such as bottles and the like, comprising a part for forming arrays of containers and a part for guiding/supplying and forming boxes from flattened punched blanks, in which said part for supplying and

forming the boxes is arranged parallel to the longitudinal direction of feeding of the containers and the said boxes.

[0008] Further details may be obtained from the following description of a non-limiting example of embodiment of the invention provided with reference to the accompanying drawings, in which:

- Figure 1 shows a top plan view of the machine according to the invention during the various stages of opening and filling of the box;
- Figure 2a shows a front view of the box forming apparatus applied to a packaging machine and at the moment when the cardboard box is gripped;
- Figure 2b shows a rear view of the machine according to Fig. 2a;
- Figure 3a shows a front view of the forming apparatus during pre-opening of the box; and
- Figure 3b shows a rear view of the machine according to Fig. 3a.

[0009] As shown, the apparatus according to the invention is applied to a vertical wall 101 of a packaging machine, not shown, but comprising a part 102 for supplying the containers 1 to be boxed, assembled on the side of the wall 101 opposite to that for forming the boxes 2 and a device 103 for gripping and transporting the containers 1 from the supplying part into the box 2 which is formed and brought to the filling point by means of the device 103.

[0010] Said machine parts are only schematically indicated by broken lines in Fig. 1.

[0011] The vertical wall 101 extends parallel to the direction of feeding of the containers 1 and the boxes 2, a direction which below, for the sake of simplicity, will be identified as the longitudinal direction.

[0012] In greater detail the box forming apparatus comprises a device 10 for guiding and supplying punched cardboard boxes forming the flattened boxes 2, which extends parallel to the longitudinal direction of the machine and is substantially formed by two pairs of upper and lower longitudinal guides 11 inside which the boxes 2 are arranged, closed, and by a thrusting arm 12 which is made to perform a translatory movement by associated actuating systems 12a which cause feeding of the boxes 2, still flattened, towards the pick-up and opening zone.

[0013] The flattened boxes contained inside the feeder 10 therefore have a rear wall 2a and front wall 2c in the direction of feeding as well as sides walls 2b, 2d which are flattened against each other and arranged transversely with respect to the said direction of feeding.

[0014] The devices for opening the box 2 are arranged in the said pick-up zone and each box comes into contact with a first device 20 for gripping and rotating the side surface 2b of the box, which in this position is still in turn transverse to the direction of feeding, and with second devices 30 for gripping and retaining the

rear wall 2a of the said box, which is in turn still transverse to the direction of feeding.

[0015] In greater detail (Figs. 2a,2b) said devices 20 for gripping and rotating the side wall 2b of the box 2 comprise a shaft 21 which is arranged substantially vertical and to which two substantially horizontal arms 22 are joined, said arms carrying vacuum means 23, such as suction pads and the like, which are designed to be attached to the side surface 2b of the closed box.

[0016] The vertical shaft 21 is supported by an actuator 21a which is in turn mounted on a guide 21b on which it is able to perform a translatory movement, in a substantially horizontal direction and in both senses, upon operation of suitable actuating systems in the example consisting of a pair of connecting rods 24a,24b having one end hinged together and opposite ends which are respectively attached to the actuator 21a and, by means of a transmission member 26a, to a first lever 26 of an actuating device consisting of a rotating cam 25. The cam 25 also has, mounted on it, a second lever 27 connected by means of a transmission member 27a to a second pair of connecting rods 28a,28b, similar to the first pair, which produce the rotation of the actuator 21a about its vertical axis.

[0017] The actuator 21a is thus able to perform a synchronised translatory movement in both directions (forwards and backwards) and rotation through 90° in both directions (clockwise and anti-clockwise).

[0018] The means for retaining the rear surface 2a of the box 2 (Figs. 3a,3b) consist of an arm 31 which is arranged substantially horizontal and perpendicular to the support wall 101.

[0019] Said arm in turn has vacuum means 32, such as suction pads and the like, and may be actuated so as to perform a translatory movement from/towards the wall 101 by means of a connecting rod 33 connected to a lever 34 which is in turn joined to the cam 25.

[0020] The operating principle of the apparatus is as follows:

- in the rest condition (Figs. 1a,1b) the cam 25 is at a standstill in a position such that the actuator 21a is translated backwards towards the box feeder 10 and the arm 31 is translated behind the wall 101;
- the flattened box 2 is supplied to the pick-up zone where it comes into contact with the vacuum means 23 of the arm 21 which attach themselves to the side surface 2b of the box;
- a first angular rotation of the cam produces the forward movement of the actuator 21a which conveys with it the flattened box, making the rear wall 2a thereof accessible;
- a further rotation of the cam 25 causes operation of the connecting rod 34 and causes translation of the arm 31 towards the outside;
- a further rotation of the cam causes the return movement of the actuator 21a and hence the box 2

until the rear wall 2a of the box becomes attached to the vacuum means 32 of the arm 31;

- a further rotational movement of the cam 25 (Fig. 3) causes the rotation, in an anti-clockwise direction, of the actuator 21a and hence the arm 21 and the arms 22, causing the rotation of the side wall 2b of the box 2 which thus assumes the intended square shape;
- the open box is made to advance towards the successive end closing and filling stations, while rotation of the cam 25 which reassumes the initial condition causes the start of a new cycle.

[0021] It is therefore obvious how the apparatus according to the invention is able to achieve the opening of flattened boxes along the direction of feeding thereof, solving the problems posed by the apparatus known in the art and described in the preamble of the present description.

[0022] Many variations may be made to the practical embodiment of the individual component parts without thereby departing from the scope of protection of the present invention as defined by the claims which follow.

[0023] The movements of the actuator 21 and the arm 31 could for example be obtained by means of d.c. motors controlled by means of encoders or by devices of the hydraulic type or the like and similarly the means for attaching the arms to the walls of the box 2 could comprise suction means aiding the suction pads or gripping means acting on the edges of the said surfaces.

#### Claims

1. Machine for packaging containers such as bottles and the like, comprising a part (102) for forming arrays of containers and a part for guiding/supplying (10) and forming (20, 30) boxes (2) from flattened punched blanks, characterized in that said part for supplying and forming the boxes (2) is arranged parallel to the longitudinal direction of feeding of the containers (1) and the said boxes.
2. Machine according to Claim 1, characterized in that said guiding/supplying part comprises guides (11) for the flattened punched blanks, which extend in a direction parallel to the direction of feeding of the latter.
3. Machine according to Claim 1, characterized in that said flattened punched blanks (2) have a rear wall (2a) and a side wall (2b) of the box which are arranged transversely with respect to the direction of feeding of the said box.
4. Machine according to Claim 1, characterized in that said part for forming the closed boxes comprises means (20) for gripping, feeding and rotating the

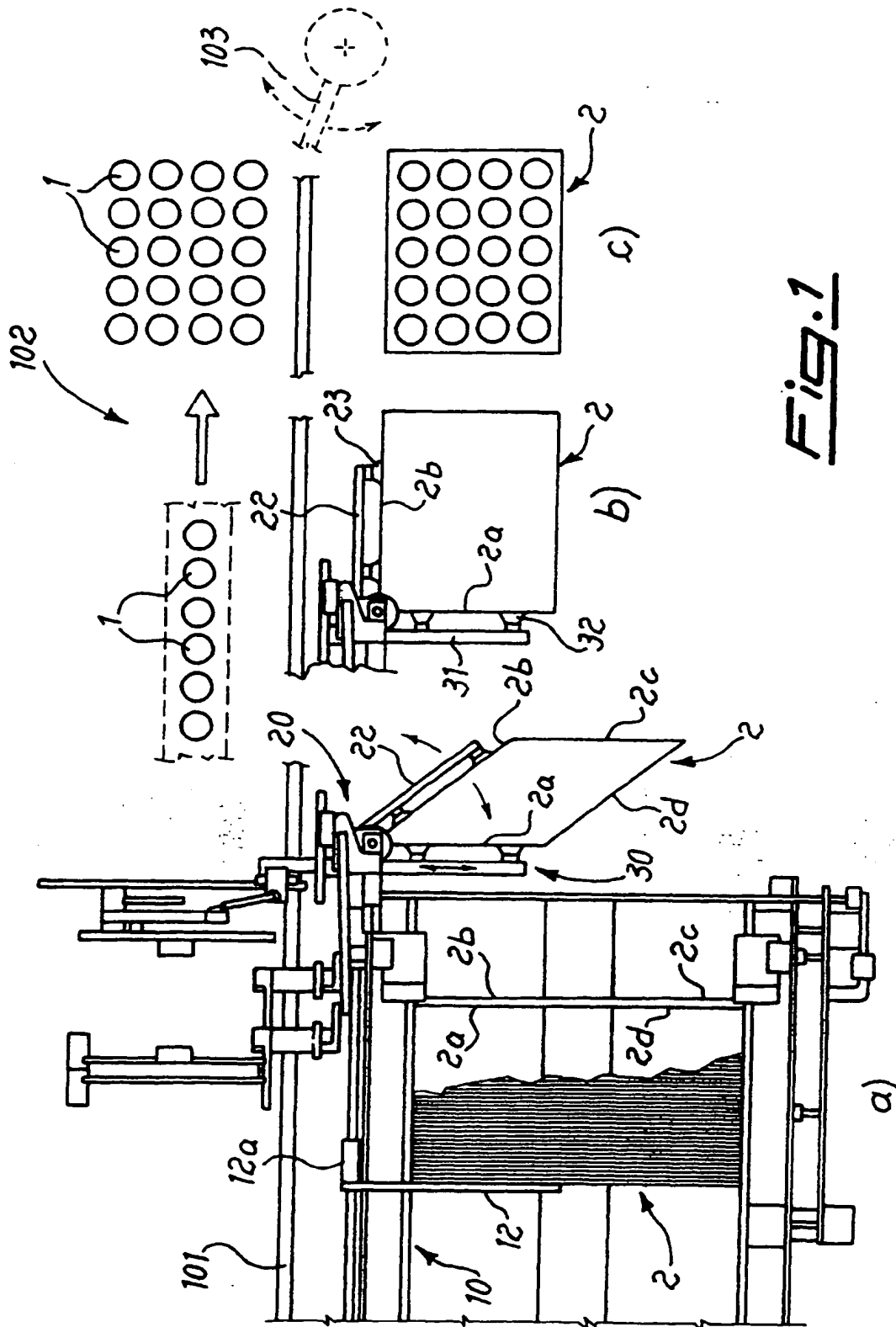
side wall (2b) of the said box and means (30) for retaining the rear wall (2a) of the said box.

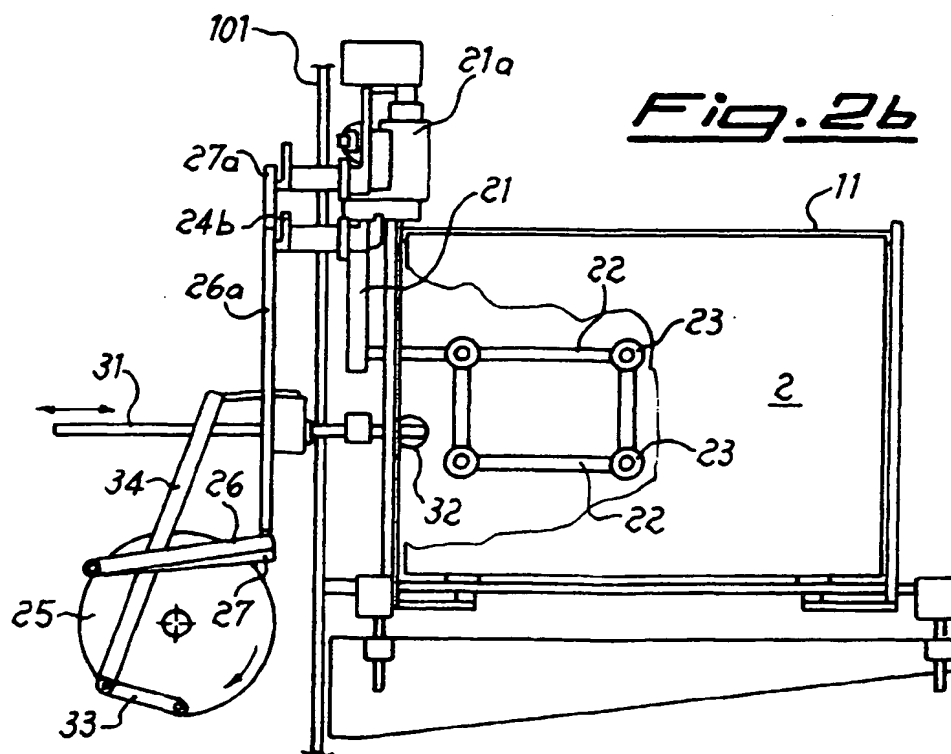
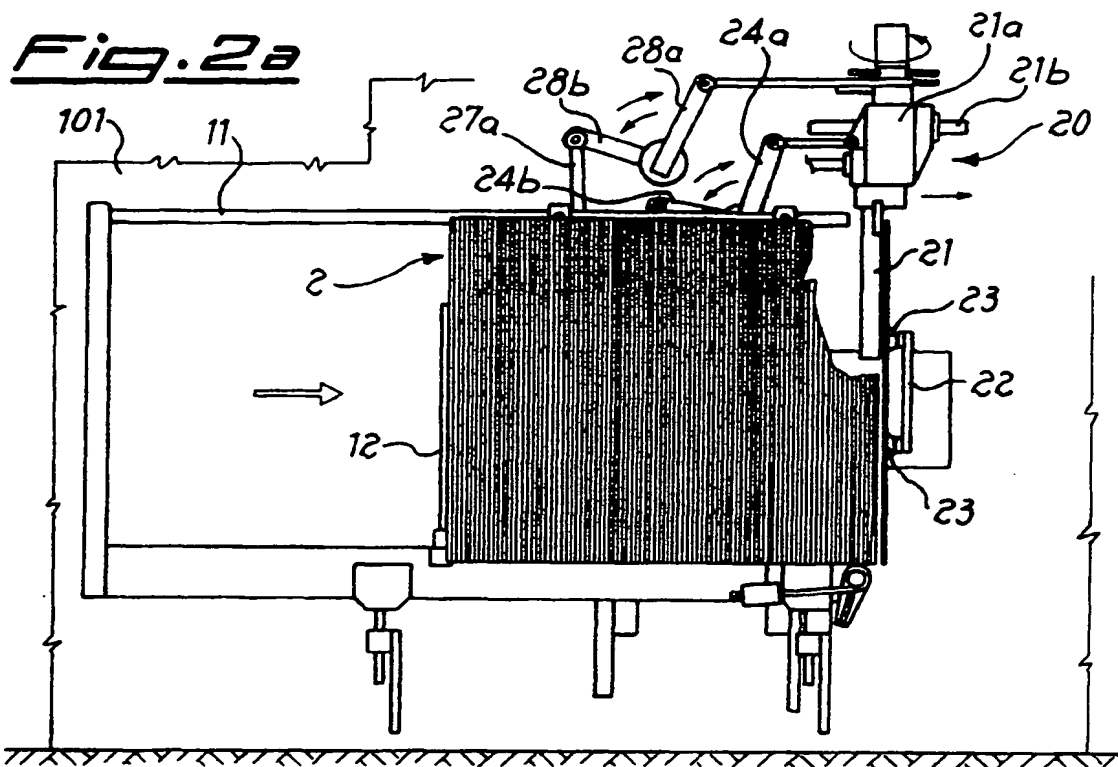
5. Machine according to Claim 1, characterized in that said means (20) for handling the side wall (2b) of the box comprise an actuator (21a) movable translationwise parallel to the direction of feeding of the boxes. 5
6. Machine according to Claim 5, characterized in that said actuator has a shaft (21) which is designed to rotate about its axis and supports arms (22) extending in a plane substantially parallel to that of the flattened punched blanks. 10
7. Machine according to Claim 6, characterized in that means (23) for gripping the side wall (2b) of the box are mounted on said arms (22). 15
8. Machine according to Claim 7, characterized in that said gripping means (23) are vacuum means. 20
9. Machine according to Claim 1, characterized in that said means (30) for retaining the rear wall (2a) of the box are formed by a substantially horizontal arm (31) which is movable translationwise and on which means (32) for gripping said rear wall (2a) are mounted. 25
10. Machine according to Claim 9, characterized in that said gripping means (32) are of the vacuum type. 30
11. Machine according to Claim 1, characterized in that it comprises devices (25) for synchronised operation of the movement of the means (20, 30) for gripping the rear wall (2a) and side wall (2b) of the box. 35
12. Machine according to Claim 11, characterized in that said operating means comprise a cam (25) acting on levers (26,27) respectively connected by means of associated transmission means (26a,27a) to the means for retaining (20) and handling (30) the rear wall (2a) and side wall (2b) of the box. 40

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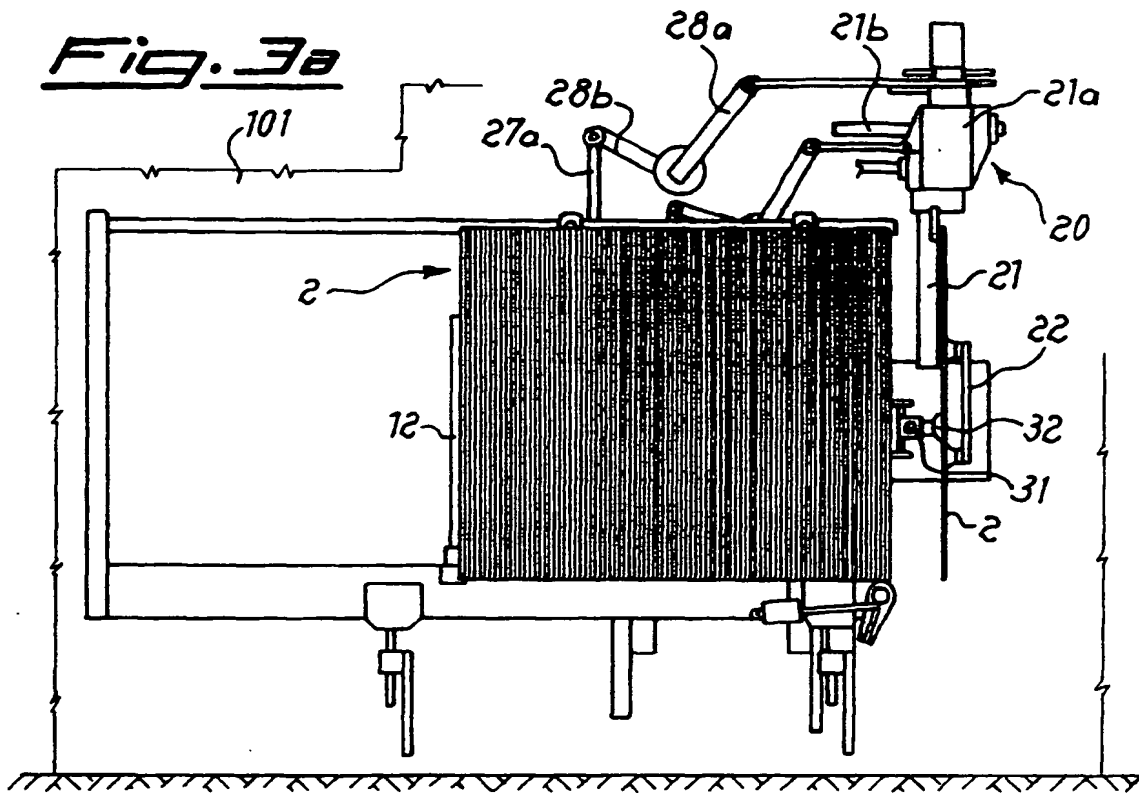
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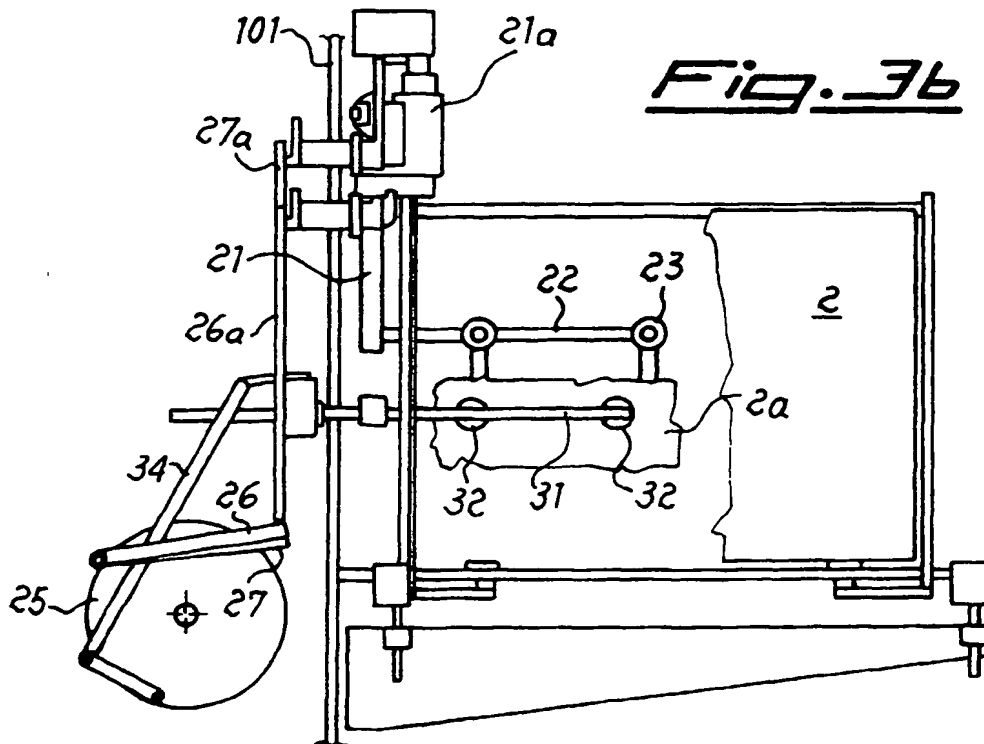


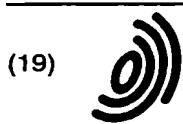


**Fig. 3a**



**Fig. 3b**





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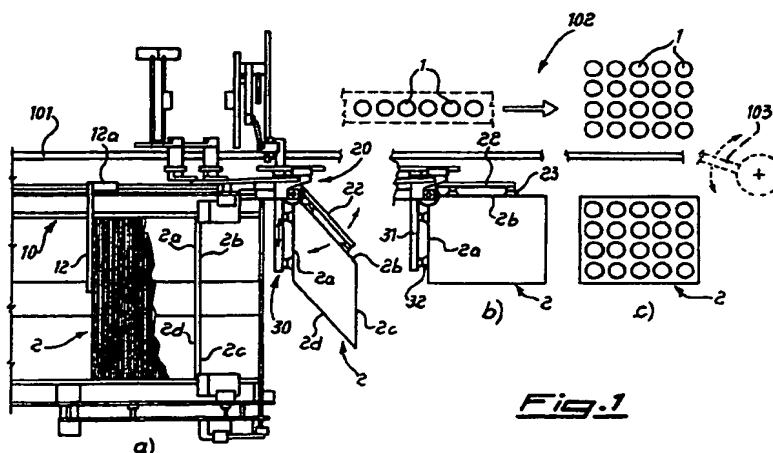
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# EUROPEAN SEARCH REPORT

Application Number  
EP 00 20 0027

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Place of search <b>THE HAGUE</b>		Date of completion of the search <b>31 October 2000</b>	Examiner <b>Farizon, P</b>
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